RECOVERY OF CONCORD GRAPE ESSENCE

Chemical Engineering and Development Division
Eastern Regional Research Laboratory[1]
Philadelphia 18, Pennsylvania

In the July 1950 issue of Food Industries, an article was published by this Laboratory entitled, "Two-Pass Concentration Technic Obtains Full-Flavor Grape Juice." Since that time we have received inquiries as to whether the extra equipment and cost justify recovery of a second essence from the distillate that results from vacuum concentration of the stripped juice. This is a logical question, because many vacuum evaporators are equipped with jet condensers and to recover the distillate would require the installation of surface condensers. Additional labor costs would also be entailed.

The answer to the question cannot be a clear-cut yes or no. As pointed out in the publication, the first essence obtained by 48 percent vaporization during essence stripping, although typically grape, was not quite adequate to restore all the aroma of the starting juice to a concentrate of about 65° Brix made by subsequent vacuum concentration of the stripped juice. This was the conclusion of a trained taste panel. The first essence so obtained, however, contains most of the aroma. For many purposes, it may be entirely adequate. In stripping such a first essence, the percentage of juice vaporized should be the maximum possible without heat damage to the juice. This percentage will vary with the design of the heating and vaporizing sections of the essence-recovery equipment. These should be designed to minimize the time that the juice is subjected to heat. Our experience has been that with Lake Erie district Concord grape juice, at least 25 percent must be vaporized to obtain a passable first essence.

The foregoing comments are applicable especially to essence stripping when the stripped juice is subsequently to be made into a high Brix concentrate, e.g., 65 Brix or higher. The situation is quite different if a frozen concentrate of about 47° Brix is being made. If the essence-recovery equipment is designed to heat and vaporize a portion of the juice very rapidly without heat damage, all the desired concentration can be done in the unit itself, incident to stripping off the essence. There would thus be no need for vacuum concentration of the stripped juice nor would it be necessary to strip every trace of aroma, for any aroma left in the juice would appear in the product.

To make an unsweetened concentrate of 47° Brix, containing the recovered essence, would require vaporization of approximately 73 percent by volume of the original juice in a single pass through the essence unit. If a sweetened concentrate is being produced, the amount vaporized in a single pass depends on the amount of sugar added; for example, if the amount of sugar to be added is four-fifths as much as the original grape solids, the evaporation need be only about 60 percent by volume of the original juice. To achieve these high vaporizations at atmospheric pressure in the essence-recovery unit and at the same time avoid a cooked flavor, the preheater and vaporizer must be designed for extremely short retention periods. A forthcoming

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1/ One of the Laboratories of the Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, United States Department of Agriculture.

publication entitled "Preparation of Full-Flavor Grape Juice Concentrates" describes how a single essence-stripping process can be effectively employed in making both sweetened and unsweetened frozen grape juice concentrates. A more detailed description of the apparatus will shortly appear in an article entitled "An Experimental Unit for Volatile Flavor Recovery." The apparatus for this work includes improvements in the unit shown in "Recovery of Volatile Apple Flavors in Essence Form", Western Canner and Packer, October 1946. These improvements permit higher vaporization of the juice without heat damage and result in more effective recovery of the aroma.